Development of a risk calculator to predict spontaneous stone passage in patients with acute ureteric colic

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Background: Renal colic is a significant problem.

- Current guidelines only mention that asymptomatic ureteric stones up to 1 cm may be managed conservatively.
- 25% of all stones may not pass and re-present as an emergency requiring intervention.
- Lack of evidence on predicting which patients may spontaneously pass their stone.
Methods

- We used the MIMIC Study 2016/17 dataset, which was a 4171-patient cohort study in 71 sites.
- 2518 patients discharged with initial conservative management were included in the modelling process.
- 1874 passed their stones spontaneously (74.4%).
- Mean age was 47 (±14.7) and 1892 were male (75.3%).
Methods

The following variables and their influence on spontaneous stone passage are assessed:

- Gender
- Neutrophil count
- Hydronephrosis
- Hydroureter
- Perinephric stranding
- Temperature
- Stone size and position
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Logistic regression was used to obtain the set of variables with the highest predictive ability for spontaneous stone passage.

The corrected β-coefficients after internal validation was used to create a nomogram.
Results

Nomogram can determine a probability of spontaneous stone passage ranging from 20% to 95%
Results

Internally validated in a subset of patients from 2009-2015 (n=1728)
- C-statistic of the corrected model was 0.77 indicating good discrimination

Externally validated in a subset of patients from 2016 and 2017 (n=789)
- Confirming that the model was insensitive to temporal trends
Calculator Interface
Conclusion

- Our risk calculator has significant potential in guiding clinical management of patients with ureteric stones.
- It allows better selection of patients suitable for conservative treatment and can be used in the counselling of patients for either conservative management or intervention.